

Abstract

Acoustic Wave Transducer With Transverse Mode Suppression

5 The invention relates to a transducer that works with surface acoustic waves in which
interfering transversal modes are suppressed. This is accomplished by mutually adapting
to one another the transversal excitation profile of the acoustic wave and the transversal
basic mode of the waveguide formed by the acoustic spur and adjacent exterior areas.
This adaptation is accomplished by dividing the acoustic spur into an excitation area and
10 marginal areas, whereby the width of a marginal area is approximately one-quarter
wavelength of the transversal basic mode, and whereby the wave number of the
transversal basic mode in the excitation area is zero. In one advantageous further
development of the invention, an excitation strength that is a function of the transversal
coordinate can be attained that is optimally adapted to the basic mode by dividing the
15 excitation area in the transversal direction into partial spurs that are wired to one another
serially and/or in parallel.

Figure 1

Legend

AS	Acoustic spur
MB	Excitation area
RB1, RB2	Marginal area
E1, E2	Electrode
Y	Transversal direction
X	Longitudinal direction
AZ1	Exciting cell
RZ1 – RZ3	Reflecting cell
AU1, AU2	Exterior areas of the waveguide
TB1 – TB2	Partial spurs
MT	Center partial spur
RT1	Marginal partial spur
AS'	Additional acoustic spur
MB'	Excitation area of the additional acoustic spur
RB1', RB2'	Marginal area of the additional acoustic spur
ZB	Intermediate area
1	Amplitude (simulation without taking into account transversal effects)
2	Amplitude [(]simulation taking into account transversal effects with a non-adapted transversal excitation profile)
1'	Group delay (simulation without taking into account transversal effects)
2'	Group delay (simulation taking into account transversal effects with a non-adapted transversal excitation profile)
3	Amplitude (simulation taking into account the transversal effects with an adapted transversal excitation profile)
3'	Group delay (simulation taking into account the transversal effects with an adapted transversal excitation profile)
11	Phase factor of the transversal basic mode as a function of the transversal coordinate (with non-adapted transversal excitation profile)
12	Phase factor of the first harmonic of the transversal basic mode (with a non-adapted transversal excitation profile)
13	Phase factor of the second harmonic [of the] transversal basic mode (with a non-adapted transversal excitation profile)
11'	Phase factor of the transversal basic mode as a function of the transversal coordinate (with an adapted transversal excitation profile)
12'	Phase factor of the first harmonic of the transversal basic mode (with an adapted transversal excitation profile)
13'	Phase factor of the second harmonic [of the] transversal basic mode (with an adapted transversal excitation profile)
14	Speed profile of the waveguide, whose basic mode is not adapted to the excitation profile
14'	Speed profile of the waveguide, whose basic mode is adapted to the

excitation profile